fications are based. The recently issued first Annual Report of the Geological Department of the Uganda Protectorate prepares us for future keen discussion on several points in the proposed classifications. Some notes on prehistoric man and on caves, water supply and soils, at the end of part 2, with further information in the appendices, are of general interest. The numerous geological sketch-maps and sections in the text, though effective in a broad way, are roughly drawn and poorly printed, so that the deciphering of their detail is often troublesome. Though unavoidable, the big exaggeration of the vertical scale in all the sections, with the consequent severe distortion of the slopes, should be constantly borne in mind, since it may profoundly affect the interpretation of the structures, particularly where questions of faulting are concerned.

In part 3 our present knowledge of the stratigraphy of the neighbouring countries of East Africa and of other regions supposed to be linked up with the "Great Rift" is usefully summarised in short chapters dealing successively with Uganda and the lakes, Tanganyika Territory, Nyasaland, Madagascar, Somaliland, and Abyssinia, with some reference also to the Nile Valley and Red Sea and to the Palestine trough. A full bibliography, thirty pages in length, forming one of the appendices, adds to the value of the volume as a book of reference.

The book is embellished by some excellent reproductions of scenic photographs as plates. The diagrammatic folding-maps are adapted from those in the author's paper on African rift valleys in the *Geographical Journal* (July, 1920), and have no geological detail.

With respect to the main theme, Prof. Gregory has presented in his final chapter a lucid and concise retrospect of his opinions. He still holds that a great rift valley, stretching for more than one-sixth of the circumference of the earth, was formed by the subsidence of strips of the earth's crust between parallel tension-faults, consequent upon the breakdown of a precedent broad arch of elevation. He believes that this structure can be traced in the features of the present surface all but continuously from Palestine, by way of the Red Sea and Abyssinia, across East Central Africa, southward to the south-east coast beyond the Zambezi; with branches, eastward into the Gulf of Aden, and westward, by way of the Central Lakes, into the Upper Nile valley. The production of the "Great Rift" is assigned to movements affecting the entire earth between Upper Cretaceous and Pliocene times, and the whole story of these movements is outlined.

It may be so. Anyhow, the idea has its value as a clear-cut working hypothesis. But we really do not know much that is definite yet about the structural features on which the hypothesis rests; and as closer investigation is now in progress at many points along the supposed course of the "Rift," we may expect soon to have better grounds for judgment. Already the existence of the "Rift" along the Red Sea has been called in question by the officers of the Egyptian Geological Survey; and in Uganda the features of the "Western Rift" are pronounced by their latest investigator to be indicative of movements of compression and not of tension (*Geograph. Journ.*, November, 1921). It is generally agreed that the deep troughs of Central and East Central Africa are due to tectonic movement, with which severe faulting is associated; but it remains to be seen whether the troughs can be strung together into a continuous chain of the length and character assumed on the "Great Rift" hypothesis. Meantime let it be acknowledged that in this volume Prof. Gregory once more proves himself to be the capable champion of a bold conception which has already served, and will further serve, for fertile controversy and the increase of earth-knowledge.

G. W. L.

The Quantum Theory.

Die Quantentheorie: Ihr Ursprung und ihre Entwicklung. By Fritz Reiche. Pp. vi+231. (Berlin: Julius Springer, 1921.) 34 marks.

THIS is an admirable account of the whole field of the quantum theory, and should be very useful to anyone who has not followed it from its origin. In a subject like this, which is not yet organised into a consistent whole, it is often exceedingly difficult to judge the importance of any particular branch of the theory. One reads a paper, but cannot form an estimate of its real value, because there is not at hand all the information on cognate subjects. This is especially true of the quantum theory, for the literature is very predominantly German, and it is customary in Germany to permit the publication of much more speculative ideas than is usual in other countries, and the result is that the truth tends to get lost in the mass of paper. The great merit of the present book is that it brings together all the threads of the argument and criticises them, so that a just view can be obtained of the whole theory without struggling through a vast quantity of literature of which a good deal is of little value. It is not a mere compilation of all the views which all writers have held at all times, but a critical estimate of the opinions at present generally accepted.

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The book contains 161 pages of text. The mathematics are relegated to a further seventy pages of notes, and the arrangement of these is rather tiresome, for the majority of the notes are simply references to original papers, and there is nothing in the text to distinguish between these and the mathematical calculations.

The order of treatment of subjects is mainly historical, and radiation therefore comes first. This is probably the best arrangement possible at present, though when the theory has been reduced to a classical form it is to be presumed that such a complex question will fall into a much later position. There follows a short discussion on the necessity of breaking away from ordinary mechanics, and then a description of Einstein's hypothesis of light quanta, and the ingenious deductions he makes from the fluctuations in radiant energy. The fourth chapter gives an account of the quantum theory in relation to the physics of solids—such questions as specific heats and Born's work on the dynamics of crystals. The next chapter deals with gases, where the theory is not quite so satisfactory. The rest of the book is mainly occupied with the Bohr theory. It includes all the more recent ideas, such as the correspondence principle, and also a certain amount about atom models.

There is little to criticise in such a fair account of the whole theory, but we may venture to say that the author is perhaps inclined to favour Planck's second hypothesis rather more than would the general consensus of present opinion. That hypothesis seems to give rather better agreement with experiment in the theory of gases, but neither of Planck's hypotheses has yet been made to cover the facts in a really convincing manner. On the other hand, the second hypothesis is quite foreign to the principles of spectrum theory, which agree exceedingly accurately with experiment. Apart from this, anyone wishing to get a just view of the quantum theory cannot do better than read the book.

Our Bookshelf.

Taboo and Genetics: A Study of the Biological, Sociological, and Psychological Foundation of the Family. By Dr. M. M. Knight, Dr. Iva L. Peters, and Dr. Phyllis Blanchard. Pp. xv+255. (London: Kegan Paul and Co., Ltd.; New York: Moffat, Yard, and Co., 1921.) 10*s*. 6*d*. net.

THIS survey of the institutions connected with sexual life and the family falls into three sections. In the biological section Dr. M. M. Knight gives a lucid summary of recent work on sex, drawing the conclusion that the difference between the sexes is quantitative rather than qualitative. In the second section Dr. Iva Peters surveys the ethnological evidence for the taboo of women, and concludes that the modern form of monogamous marriage is essentially a survival of a compromise between man's erotic desires and his fears of woman's *mana*, which has produced an "ideal woman," a type out of harmony with modern developments. This is perhaps the least satisfactory of the three sections. By dwelling too exclusively on taboo and its results it ignores equally important factors in the various social complexes which influence the institution of the family. Dr. Phyllis Blanchard, in dealing with the psychological side of the question, has provided the most stimulating section of the book. By a skilful analysis she places before her readers the chief elements which are responsible for disharmony in modern marriage and the causes which, partly through the increased social activities and individualism of women, are bringing about the exclusion of a large body of the female population from participation in carrying on the race.

Sulphur and Sulphur Derivatives. By Dr. H. A. Auden. (Pitman's Common Commodities and Industries.) Pp. xviii+101. (London: Sir Isaac Pitman and Sons, Ltd., n.d.) 3*s*. net.

DR. AUDEN gives a very readable and accurate account of the manufacture and uses of sulphur and its derivatives, especially sulphuric acid, and his book should prove useful to students and general readers. Although two illustrations of the Gill furnace are given, its mode of operation (which cannot be seen from the illustrations) is not mentioned. The changes observed on heating sulphur are not quite correctly described (p. 5). Moreover, the statement (p. 29) that "almost the whole supply of ammonium sulphate is at present derived from the distillation of coal" refers only to English practice; in more progressive countries very large quantities are produced from atmospheric nitrogen. Although the earlier history of the contact process is given, the real commercial process (p. 61) is not ascribed to any particular inventor—the work of the Badische Co. would seem worthy of mention, and diagrams of the apparatus would also be useful.

Examples in Optics. Compiled by Dr. T. J. I'A. Bromwich. Pp. 16. (Cambridge: Bowes and Bowes, 1921.) 2*s*. net.

DR. BROMWICH has collected sixty questions in optics for use in class-room at St. John's College, Cambridge, and has given references to eighty-four Tripos questions set between 1910 and 1921. The examples printed in the pamphlet cover a fairly wide range, and have evidently been selected by an experienced teacher. In many cases the questions have a direct practical application, or point towards a method of making some important optical measurement. Special attention may be directed to the examples connected with the cardinal points of a system of lenses or refracting surfaces, which should prove a useful supplement to practical work in the laboratory.

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